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Moderators' Report/ Principal Moderator Feedback

Summer 2013

GCSE Design & Technology

Resistant Materials (5RM01)
Creative Design & Make Activities

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Introduction

This is the third full year of this specification which has seen continued overall improvements to student's work and administration issues generally reduced across the centres. I would also like to welcome many centres that submitted work this year for the first time. In general this year we have seen the vast majority of centres have continued with the traditional approach to this controlled assessment by allowing students to design and then manufacture that student's conceptual product. However, it was pleasing to note that more centres this year took the opportunity to split the project in two. To allow students to be really creative and design /model one product and then to manufacture a different product that had the complexity and skills required at Key Stage 4.

Centres are also to be congratulated on ensuring that students presented work that was within the five controlled assessment themes set by the board.

My team of moderators have reported a number of factors that I would like to share with you in this document. It is hoped that everybody will be able to glean some information that will improve their centre's performance in future years.

Administrative issues

Centres are reminded that only the work of the requested sample on the OPTEMS should be sent to the moderator; if any requested students are withdrawn then centres should send a replacement portfolio. In addition to the sample, the work of the highest and lowest scoring students should also be sent if not included in the original sample request. This is very important as it enables us to capture your highest and lowest scores for the process of awarding grades to each centre. I would recommend that the use of heavy folders should be avoided as this adds to the centre's postage charges.

The Candidate Mark record Booklet (CMRB) used by centres for each student has again caused some issues. These should be used to guide the moderator to understand how centre assessment has been awarded. It is vital therefore that each CMRB from the sample requested is utilised to the maximum. On the first page it should contain full details about the centre, student's number, name and task selected. There is also space for one high quality photographic image of the product made by the student. Additional photos are then to be inserted later in the booklet.

On the next few sides the assessment criteria are presented and allow centres to mark/ring/highlight aspects of the criteria to produce a best fit for the work presented by the student. Centres should then page reference this work to allow the moderator to be directed towards it and then can compare the centre's assessment to national standards for accuracy and fairness. This works only if the student's work is clearly labelled, is

sequential and consists of a folio where page numbering has been used throughout.

Centres have reproduced the CMRBs in a variety of ways, the best method contained a portrait style approach double sided printed and stapled at the centre for security. This made the booklet a very manageable document and allowed all the addition of marks to be accurately counted and recorded prior to transfer to the OPTEMs sheets or EDI sheets. In the extreme case, CMRB sheets were found to be out of order, upside down, not page referenced and contained arithmetic errors. Due to the high numbers of addition errors being seen by moderators, centres are requested that it would be good practice that work is double checked or proof read by another individual prior to despatch to the moderator.

The Assessor witness statement allows centres to support the marks awarded for the skilled use of tools and equipment by the student during manufacturing stage. Evidence here could support assessment criteria and is viewed alongside the photographic evidence of student achievements. Finally the CMRB is to be signed by both the assessor and the student to authenticate the work submitted for assessment. Moderators have returned to centres any sheets missing such signatures for authentication.

Design Activity

Analysing the brief

This section was reasonably well completed by many students who used this section to really set the scene of the problem brief and offer some insight into who they were designing for (the client). Generally marks were correctly allocated and centres appeared to know how to access the middle and top range of marks. However, the centres that over assessed this section tended to be awarding marks for the design brief as well when in fact they only included a superficial spider diagram. This section is about **analysing** the brief, not problem solving to determine the need.

The best responses were where the student had not only identified the key aspects (often in a spider diagram) for research, they had then explained why they were key and had then also informed the reader how they were going to gather the information required - the weakest students could barely outline the main points - they often left out sustainability issues. The best use of the spider diagram approach led to the formulation of a series of questions to answer in the research and had used the headings such as form, function, performance requirements, and sustainability. There were unfortunately still a lot of basic, generic spider diagrams which could have been applied to any design brief and as such do not have access to higher marks.

Research

Research generally has improved this year with a greater proportion of centres making effective use of relevant and focussed product analysis that feeds into specifications and ideas/development. In some instances students failed to produce selective and focused research tending to concentrate on materials and manufacturing processes with information on techniques they could use.

The top range of marks went to candidates that clearly showed the progression through to their specification and included details on each relevant aspect identified in their analysis.

The good news is that in general, the moderators have reported a reduction of generic “research materials” found in folios. In the past, this had resulted in a great deal of “padding” with many generic A3 sheets seen that added nothing to the understanding of the product in question. Mood boards (although reduced) were again seen that often bore little or no relation to the project being undertaken, these should be avoided. Where it was good, students produced succinct focused research concentrating on such things as the environment and location the product was intended to be used in. They contained details and dimensions of things to be stored such as wine bottles, CDs or cosmetic containers for example and a good thorough product analysis of an existing product.

In very good work the product analysis was detailed and again related to the various criteria such as form, function, performance requirements and mentioned sustainability issues. Very little independent “real – life” research is carried out by the students relying more on internet solutions with copy and pasting of images found. Questionnaires that seek user group feedback are to be encouraged but the questions asked should relate to the product in question and should help the student form ideas. Bland generic questions should be avoided as answers to them will not inform the decision process being carried out.

Specification

This section is perhaps best achieved where students have a table with the specification point, a detailed justification, a measurable point/section, with a suggested test. This detail will help students in the final section where the product is “tested and evaluated” as it gives measurable points to test against. This work will also be used in the **review** section looking at how the initial ideas rate against the specification points. Moderators reported that some students produced specifications that were limited to the middle mark band as they lacked any sort of justification back to the research. An improvement from previous years but there are still a lot of candidates not producing measurable and technical specification points. Many students could enter the top mark box through comments that were realistic, measurable and had mentioned sustainability. Where sustainability had been covered it was generally of a generic content as opposed to being specifically related to the product’s life cycle and design brief. The centres that asked students to think about how they would test, check or measure each specification point at this stage were the most successful at generating strong specifications.

Initial ideas

Most centres submitted good work in this section with many centres submitting excellent sketch work. Annotation of sketches was not generally focussed on the specification points. Some centres had directed their students to produce three or four different design ideas but other students might produce eight to ten ideas but they lacked any real detail to be useful. Some students fail to expand their ideas here, when designing a table for example other shapes and leg configurations do exist to enable creative flair to shine through. Although many students will produce nice drawings of realistic products, they must annotate in more detail and add mini sketches to explain what materials might be used or indicate the processes that could be used to make them. Centres that have clearly taught their students to sketch and design well indicate that ideas were well annotated with a detailed understanding of materials, processes and techniques. Research gathered in the earlier sections needs to be better used in leading and formulating design ideas that relate to all key specification points.

Centres who submitted their work on CD occasionally did not do the work justice because scanned-in sketches were not easily visible in many cases. Those centres that used only CAD did not usually successfully generate a

range of ideas. A combination of CAD and sketch work should be encouraged. In some centres however much of the work seen was too similar, showed limited creativity with little annotation to explain intention, materials or processes. It should be remembered that this section is for initial ideas. The finished product should not be identical to images produced here, there has to be room for refinement and development otherwise access to marks later could be restricted.

Review

The moderators reported that the review stage was generally improving in the work seen this year, but that it remains a very mixed approach across many centres. If a Centre approached it well then most students were successful. Those students who did not include measurable points in their specifications did not score highly here.

Some good work was seen where students had clearly reviewed their work objectively against the initial specification as a separate sheet and had considered user group feedback and issues of sustainability. On too many occasions however, students simply resort to using tick boxes, smiley faces or a scoring system ranging from 1 to 10 for example to review their work often alongside the idea in question. This is not subjective and students must be better guided in future series to undertake objective evaluations. A separate sheet is preferable rather than making comments alongside the initial idea sketches where more room exists to expand the thoughts and decisions. Ideally targeted user group feedback should be used which is relevant to the product rather than using peers in the class for opinions.

Communication

This section is assessed across the whole project; moderators reported a varied approach to assessment here. Most centres had access to Computer Aided Design software and students had used it effectively. Some centres did not have so much access to CAD or ICT use in their portfolios which could limit student presentation. Other centres had looked at the overall presentation of the folder and the use of ICT within it to award marks here. Both are acceptable approaches providing that the ICT is appropriate and age specific skills are rewarded.

It should be noted that the final design section would benefit from greater student skill in the production of working drawings, rather than just CAD representations of the product, exploded views might help explain initial ideas and sectional views might be useful to explain manufacturing intentions. Most students included photographs in both the development (modelling) and manufacturing stages – at best these were also clearly annotated and added much to the projects overall feel.

Development

Generally this section still tends to be poorly completed with most students focusing on developing one single initial idea from a manufacturing perspective rather than amalgamating various elements of their initial ideas into a single final design proposal. This is a stage where students often fall down and loose marks. Often no significant changes occur between initial idea and the final design. Again students seem unclear as to the purpose of development or in some cases are producing development quality initial ideas early on with very little left to modify or improve upon. Students were either producing quality sketch work with real development from their initial idea; but no modelling in traditional physical methods / CAD – or they produced models/CAD which were tenuously referred to.

Top scoring students used both CAD modelling and traditional 3D modelling in demonstrating their modifications, relating them to the specification and user group feedback. Students are very frequently unaware of the purpose of the models they are making, which leads to unclear comments and conclusions. Ideally in this section students will take us on a genuine developmental journey with justified modelling witnessed through photographs, along the way that will test/refine the initial basic design. The use of user group feedback to help refinements was often missing from student's work; this ultimately restricts access to all the marks available.

Final design

There was a relatively mixed performance in the final design section. Some students still just produce a presentation drawing of their chosen developed design whilst others produce a fully dimensioned working drawing and a materials/cutting list or schedule. Some centres use development and final design as one assessed area, they are not and should be separate sections clearly labelled by the students. Centres should be advising their students that this section should culminate in a single final design proposal of their intended product with information on how it might be manufactured.

In centres, students would be better guided in future series to present a single final design proposal which then considered the technical details of the materials and/or component parts. Processes and techniques to be used for the manufacture of the final design could also be detailed on such a drawing. Final designs seen by the moderators often lacked enough detail for a third person to construct the product. Moderators reported that there were few well produced fully dimensioned drawings or cutting lists to aid understanding. ICT and CAD packages were often seen to produce good results for the students but should contain more information as notes to assist interpretation.

Make Activity

Reminder:

If centres are using the two project approach to assessment, centres will **need to provide students with** working drawings of the intended product to be made that is suitable for a KS4 project. Also the specifications that should be detailed, justified, contain measurable points/section, with suggested tests, as this is how the Testing & Evaluation with QWC marks are awarded. Failure to provide these specifications could limit access to marks in this section.

Production plan

This section produced a wide variety of responses, at best this was achieved through a tabular format where students had evidenced the correct sequential order for manufacture of the product, had included evidence of suggested timings, had detailed specific and varied quality control checks that could be made for that stage of making and showed knowledge of which tools and equipment should be used. A significant number of students were awarded high marks in this area but a lack of detailed information on quality control checks took away from the work. Many would write that they "would check the sides are straight" but the top students would discuss how exactly they would do this. Some students presented this aspect as a flow diagram instead – they tended not to score as highly as the detail was not nearly as good in the restricted space available. Students rarely provided information that was technical and detailed enough to enable someone else to work from their plans. The title "production plan" should indicate that this is a plan of future events but sometimes moderators reported that this section was evidenced as a diary format reflecting past events, this is not acceptable. In some cases a photographic diary of construction was evidenced as a production plan when it could never be a predictive future plan.

Quality of Manufacture

Centres are to be congratulated on the whole for the high level of outstanding products that were made this year. In these centres students had produced work that was suitably challenging and had demonstrated a wide range of skills accurately performed and were appropriate for Key stage 4 students. Some work witnessed by moderators was not deemed to be at such an appropriate level for the KS4 students. Although reducing in occurrences, some students had relied too heavily on Laser or CAD/CAM produced articles yet were awarded high marks, a reminder to centres is needed about the 50% rule (see page 17 of the specification). In some instances students had provided no information or justification as to why tools, equipment and processes had been used and although the centres had correctly filled in the CMRB in some cases it was difficult to justify how marks had been awarded particularly at the top end when trying to judge accuracy and precision. Centres would be advised to guide students to include such evidence either via photographs or written comments to justify

these high marks, good photographic evidence is so important here to help support marks awarded by centres. Centres are also reminded that the Assessor Witness Statement will help moderators see what was completed at the centre by each student and what level of guidance they received during the manufacturing stage. These tended to be well used by most centres and the information provided was detailed and helpful.

Quality of Outcome

This section was again a pleasure to witness the varied and detailed work produced by GCSE students in centres. The level of complexity of projects, variety of materials used and pride students had in their work often was demonstrated well. Very few “unfinished” projects were seen this year.

Where moderators have seen projects that did not have the complexity and rigour for KS4 or had projects that included the over use of CAD/CAM equipment (such as laser cutting) it was much harder to agree centre assessments. This section was generally well marked by centres but it is important that some form of rank order and parity be established within centres to ensure that students are marked and rewarded fairly.

Photographic evidence of the individual student’s work could be better used in this section to justify the award of higher marks where the product includes the manufacture of high quality component parts that are accurately assembled and well finished. The CMRB allows a variety of photographs to be attached as a record but also the student should include photographic evidence in the folder of the finished product they have made.

Health and Safety

This section was generally well done however; some centres had assessed students in the lower mark band yet photographic evidence provided in the folder showed students working safely. Given that the teacher observation is sufficient to be able to award the full two marks available moderators generally agreed centre assessment here.

Testing and Evaluating

This section should be an extended piece of written work as the QWC marking also occurs in this section of the portfolios. If a student produces no testing and evaluation work, then the QWC mark must remain at zero. The moderators generally reported that the testing and evaluation section is improved this year with a greater proportion of students developing appropriate testing, although improved specifications would facilitate further improvements in this area.

The responses to this section varied widely across centres; at best this section was very detailed with a clear range of relevant and measurable tests with their results also containing useful sustainability issues and user group feedback. These tests were developed from the ones initially described in the initial specification points. The photographic results of tests in situ were displayed in a detailed, objective evaluation and future

modifications proposed and were fully justified. Third party and user group evaluation was in evidence but for the most cases it lacked objective or detailed evaluative comments that were of use in assessing the merits of the product. In other cases a simple table of specification points and met/not met assessment occurred. This was often subjective especially with tick boxes being used or where one or two generic tests which were not objectively measurable against the specification were used. It is recommended that the user group feedback does not necessarily come from peer groups but reflects the thoughts of the target user of the product. The need to assess sustainability issues was again not well done this year by many centres; a life cycle analysis would perhaps help students cover the area of sustainability. Centres who had submitted a separate make project and who had not provided detailed specification points to complete end tests against for their students tended to score badly in this section. Without this fully measurable specification, student's evaluations became generic and vague in some instances.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwant to/Pages/grade-boundaries.aspx

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